

THE USE OF TECHNOLOGICAL PROPERTIES OF COTTON VARIETIES IN THE CONFIRMATION OF THEIR IDENTITY

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Introduction

One of the most useful branches of taxonomic activity is that concerned with constructing keys for botanical identification, especially if the plants are cultivated and of economic value to a wide range of people. However, taxonomists have for centuries concentrated on ascertaining the identity of wild plants, with only a few minor attempts with some cultivated plants of limited areas, thus leaving an almost untouched field with plenty of scope for much-needed taxonomic work. Interested as we are in this aspect of taxonomy, we started a key-generating program for cultivated plants and in a previous article (El-Gazzar, Sallouma and Abdellah, 1975) 26 characters from vegetative and floral morphology and palynology have been recorded comparatively for 18 varieties of Gossypium barbadense L. and used in the synthesis of a non-indentd dichotomous key to them. The same varieties also show considerable variation in technological properties, so that it seemed worthwhile to put it to practical use in constructing another key to these varieties. But as it is generally acknowledged that the characters used in botanical identification should be as easily observable by the user of the key as possible and that the recording of the technological characteristics of the different cottons is rather laborious, time-consuming and requires the use of certain apparatus (which might not be easily available), the key presented in this article is meant for use in the confirmation of the results obtained by our previous key.

The characters

The 8 characters recorded comparatively in Table 1 for the 18 cotton varieties are briefly outlined in the following; they have all been scored at controlled atmospheric temperature ($70^{\circ}\text{F} \pm 2^{\circ}\text{F}$) and relative humidity ($65\% \pm 2\%$):

1. Fibre length: also known as the "half-fall"; measured by Balls' sorter (Balls, 1928),
2. Hair weight: taken as an indication of fibre fineness and estimated according to Lord's (1961) method,

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3. Micronaire reading: a combined measure of fibre fineness and maturity; for details of apparatus and technique see Evans (1973); this character is denoted in the key by M \bar{r} ,
4. Fibre strength: measured according to the procedure and recommendations of the American Society for Testing and Materials (ASTM, 1967),
5. Fibre elongation: as given by the stelometer,
6. Lea product: an indication of yarn strength; determined according to ASTM (1967), and denoted in the key by LP,
7. Seed index: the weight of 100 seeds, and
8. Lint colour: as given by a calibrated Carl Zeiss leucometer.

Table 1. Data-matrix of the 8 technological characters listed in the text and recorded comparatively for 18 varieties of Gossypium barbadense L. Each value represents the average of at least 3 measurements of the same character for the same variety.

varieties	characters							
	1	2	3	4	5	6	7	8
Giza 7	43	144	3.2	30.8	7.6	2400	10.9	69.3
Giza 30	41	147	3.4	32.5	7.5	1690	10.0	81.5
Giza 45	49	107	3.1	37.7	7.5	2950	9.8	81.4
Giza 66	41	164	4.4	29.5	7.7	1825	10.4	63.3
Giza 67	43	160	4.1	32.9	7.7	2040	11.8	74.6
Giza 68	45	115	3.1	34.1	7.2	2680	9.9	73.2
Giza 69	43	134	3.8	31.5	7.3	2140	10.6	81.0
Giza 70	48	131	3.8	38.7	6.8	2810	9.9	76.3
Giza 71	48	107	3.8	38.5	8.0	3160	9.9	74.7
Giza 72	44	171	4.5	30.3	7.1	1770	10.7	68.3
Giza 73	44	140	3.1	33.8	7.7	2100	11.5	73.6
Giza 74	44	143	4.2	32.2	7.3	1990	10.1	78.7
Giza 75	43	152	3.8	34.2	6.1	2350	10.0	82.5
Ashmouni	40	173	4.4	28.0	7.4	1630	10.3	67.8
Bahteem 190	46	142	3.6	31.1	8.7	2310	13.7	82.0
Dandara	41	138	3.7	30.7	8.2	1995	10.8	69.4
Karnak	46	123	3.3	38.1	7.6	2410	12.4	74.3
Menoufi	46	124	3.4	32.1	7.5	2550	10.0	74.8

The key

As there are no identicals among the 18 varieties in terms of the 8 characters recorded in Table 1, these characters acquire a diagnostic value for these varieties. Thus an identificatory key has been constructed along the same lines followed in our previous article; needless to say, this key is only one of several possible keys which could be based on the same set of comparative observations scored in Table 1. The following key is of the non-indented dichotomous type, but it could easily be transformed into the indented type by those who prefer it.

1. Seed index less than 10	2
Seed index 10 or more	5
2. Elongation 8, LP 3160	<u>Giza 71</u>
Elongation 7.5 or less, LP less than 3000	3
3. Lint colour 81.4	<u>Giza 45</u>
Lint colour less than 77	4
4. Half-fall 45, weight 115, MR 3.1	<u>Giza 68</u>
Half-fall 48, weight 131, MR 3.8	<u>Giza 70</u>
5. Weight less than 125	6
Weight 134 or more	7
6. Strength 32.1, LP 2550	<u>Menoufi</u>
Strength 38.1, LP 2410	<u>Karnak</u>
7. Weight 160 or more	8
Weight 152 or less	11
8. Weight less than 165	9
Weight more than 170	10
9. Lint colour 63.3, LP 1825	<u>Giza 66</u>
Lint colour 74.6, LP 2040	<u>Giza 67</u>
10. Half-fall 44, strength 30.3, LP 1770	<u>Giza 72</u>
Half-fall 40, strength 28.0, LP 1630	<u>Ashmouni</u>
11. LP 2300 or more	12
LP 2140 or less	14
12. Lint colour 69.3, MR 3.2	<u>Giza 7</u>
Lint colour at least 82, MR 3.6 or more	13
13. Weight 142, elongation 8.7, seed index 13.7	<u>Bahteem-190</u>
Weight 152, elongation 6.1, seed index 10.0	<u>Giza 75</u>
14. Lint colour 81 or more	15
Lint colour less than 79	16
15. Weight 147, LP 1690	<u>Giza 30</u>
Weight 134, LP 2140	<u>Giza 69</u>
16. LP 2100, MR 3.1	<u>Giza 73</u>
LP less than 2000, MR at least 3.7	17
17. Strength 32.2, lint colour 78.7	<u>Giza 74</u>
Strength 30.7, lint colour 69.4	<u>Dandara.</u>

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